

TOWN OF COLMA
SAFETY ELEMENT
JULY 1993

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1.000 INTRODUCTION

1.100 PURPOSE

The Safety Element is intended to reduce the risks of harm to the public resulting from geologic and other hazards. Seismic, geologic and man-made hazards are identified and described, and policies and programs are presented to prepare for, prevent and respond to these potential hazards. The Safety Element also relates local safety planning efforts to Town land use decisions and provides detailed information for decision makers to use.

1.200 STATE LAW REQUIREMENTS

State law, Government Code Section 65302(g), requires cities and counties to identify hazardous conditions and to prepare and implement policies that minimize risks to public health, safety and property. The specific hazards discussed in the Colma Safety Element are:

- a) seismically-induced surface rupture,
- b) ground shaking,
- c) ground failure,
- d) liquefaction,
- e) slope instability and subsidence;
- f) flooding;
- g) tsunami*;
- h) seiche*;
- i) dam failures*;
- j) other geologic hazards*; and
- k) wildland and urban fires.

* The above items with an asterisk do not occur in Colma.

1.300 RELATIONSHIP TO OTHER GENERAL PLAN ELEMENTS

The Safety Element is related to all of the other General Plan Elements. The planning and policy decision making process for land uses, housing, circulation and open space must incorporate the policies of the Safety Element to reduce the risks of geologic and man-made hazards to the public. Safety issues are considered in the designation of land uses, and in the siting and design of buildings and streets.

2.000 GEOLOGIC HAZARDS

2.100 GEOLOGIC SETTING

2.110 The San Francisco Bay Area is generally comprised of northwesterly trending mountain ranges and valleys, which reflect the alignment of the coast ranges and the prevailing orientation of major faults, folds and associated

geologic units. The Town of Colma is situated along Colma Creek in the stream valley that runs southeasterly from Lake Merced and is flanked by the San Bruno Mountains to the northeast and the Santa Cruz Mountains to the southwest.

The Colma area is dominated, seismically, by the San Andreas Fault system. The San Andreas fault and associated rift valley lies in the Santa Cruz Mountains, approximately two miles west of Colma.

The Colma area is characterized by rolling foothills that extend east and west from the alluvial fan deposit associated with Colma Creek. The bedrock types underlying the Town include the Colma Formation, the Merced Formation, and the Franciscan Formation. The Colma Formation consists of poorly consolidated friable, well sorted, fine to medium grained sand, gravel, silt and clay deposits that forms most foothills from Daly City southward through Colma Valley to Burlingame. The Colma Formation overlies the Merced Formation in Colma Valley. The Merced Formation consists of the unconsolidated and moderately consolidated sandy silt and fine sand that extends throughout the Santa Cruz Mountains. The Franciscan Formation can be found in the San Bruno Mountain foothills. This association is composed of sedimentary volcanic and metamorphic rocks of shale and siltstone containing blocks of sandstone, greenstone and chert. The bedrock and surface geologic characteristics are shown in the Geology Map, Exhibit S-1.

2.200 GEOLOGIC HAZARDS

Geologic hazards include subsidence, settlement, and slope instability. The potential for these geologic hazards to occur in Colma is discussed below.

2.210 Subsidence and Settlement. Subsidence of the land surface is caused by the extraction of large volumes of fluid (water or petroleum products) from deep in the ground, or collapse of underground mines. Settlement is a shallow phenomenon that results from the consolidation of near-surface soft soils (e.g. Bay mud) due to loading by fills or heavy structures. Widespread ground subsidence due to groundwater or petroleum withdrawal is not a significant potential hazard in Colma. Any hazards associated with settlement can be mitigated by proper foundation engineering.

2.220 Slope Instability. Slope instability is associated with landslides and mudslides, which are movements of soil, rocks or debris as a result of falling, sliding or flowing, and may occur through natural causes such as heavy rainfall or poorly consolidated bedrock, or through improper land use methods such as overwatering, undercutting slopes or overloading the tops of slopes.

The USGS Preliminary Map of Landslide Deposits in San Mateo County, California, by Earl E. Brady (1972), shows a small landslide deposit on the slope behind the auto dealerships, north of Serramonte Boulevard. Other areas of landslide susceptibility are shown on Exhibit S-3, the Hazards Map. Landslides are not abundant in Colma and the Town has a slope stability rating of "Fair". Areas in Colma with a potential for slope instability are the hillsides with slopes averaging 6 to 23 percent. These areas may experience ground failure due to

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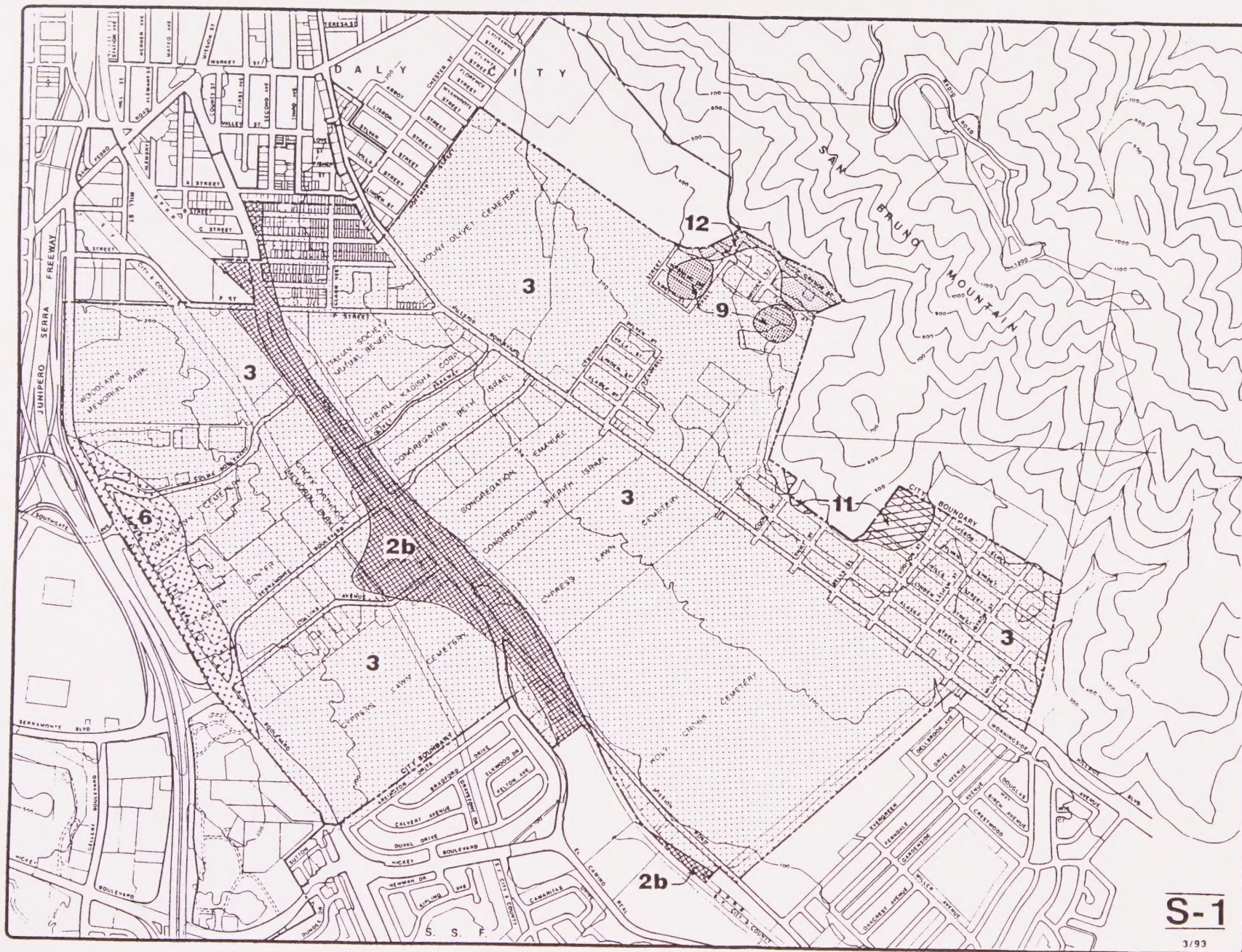
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TOWN OF COLMA GENERAL PLAN

GEOLOGY MAP

- GEOLOGIC MATERIALS**
- 2b** MEDIUM TO COARSE-GRAINED YOUNGER ALLUVIAL FAN DEPOSITS
 - 3** COLMA FORMATION
 - 6** MERCED FORMATION
 - 9** SHEARED ROCKS OF THE FRANCISCAN ASSEMBLAGE
 - 11** UNDIVIDED FRANCISCAN SANDSTONE
 - 12** SANDSTONE

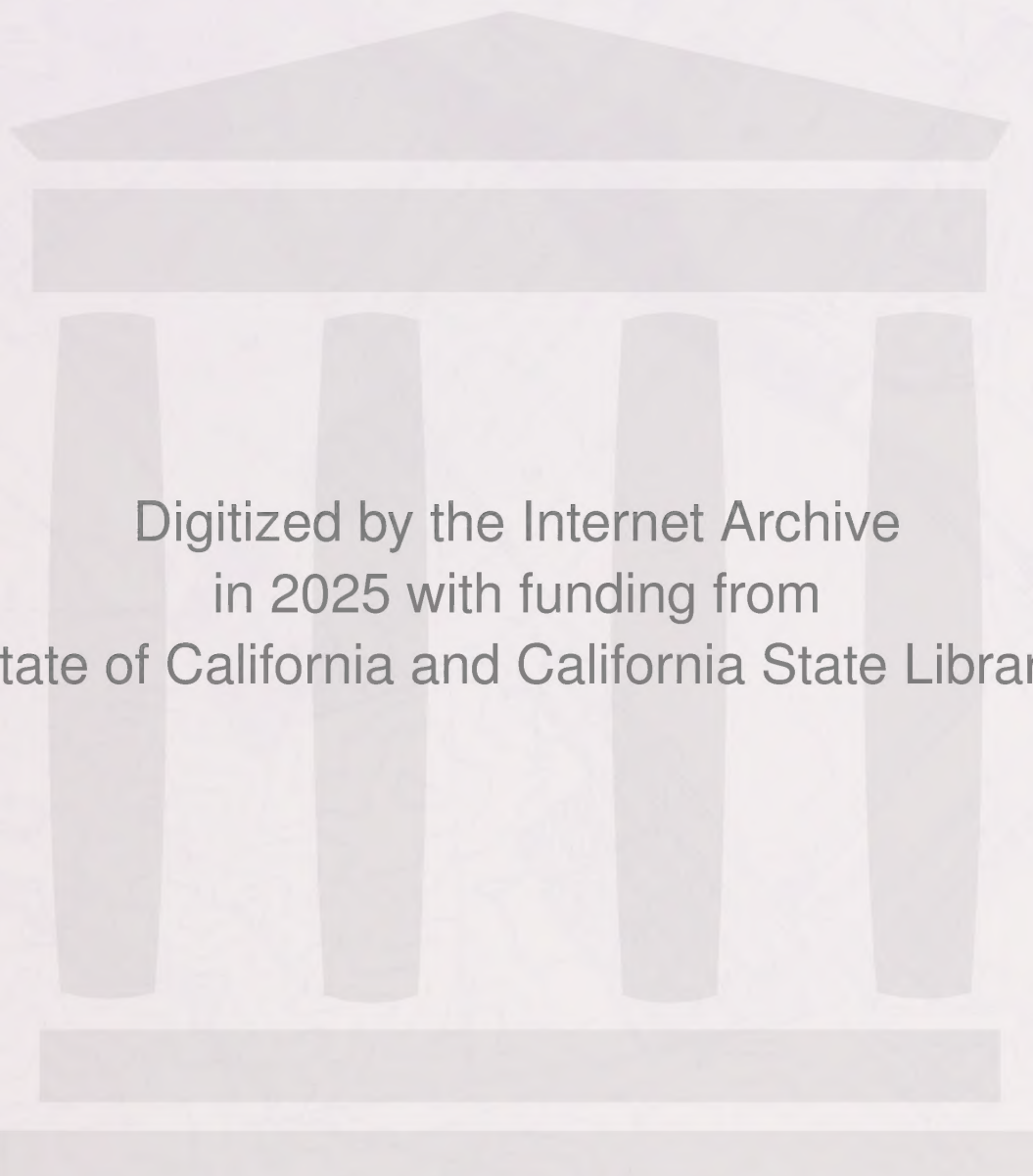
NOTE: Geologic materials numbers correspond with the numbers on the County's Map referenced below

SOURCE:
Geotechnical Hazards Synthesis
Map, County of San Mateo, 1973



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S-1
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the unconsolidated geologic units of the soil; however, they won't be widespread and catastrophic. In addition, areas where artificial cuts have been made in the alluvium, have a minor landslide potential. This could affect the westerly edge of the Sterling Park area, which is on a bluff above El Camino Real, and golf course lands at the base of San Bruno Mountain. The recent alluvial materials closest to the Colma Creek drainage have a minor potential for lateral spreading in the event of seismic shaking. To reduce these risks the Town's Municipal Code (Sections 5.223 and 5.710) calls for geologic and soil reports, as required by the City Engineer, to ensure that structures are appropriately designed and engineered.

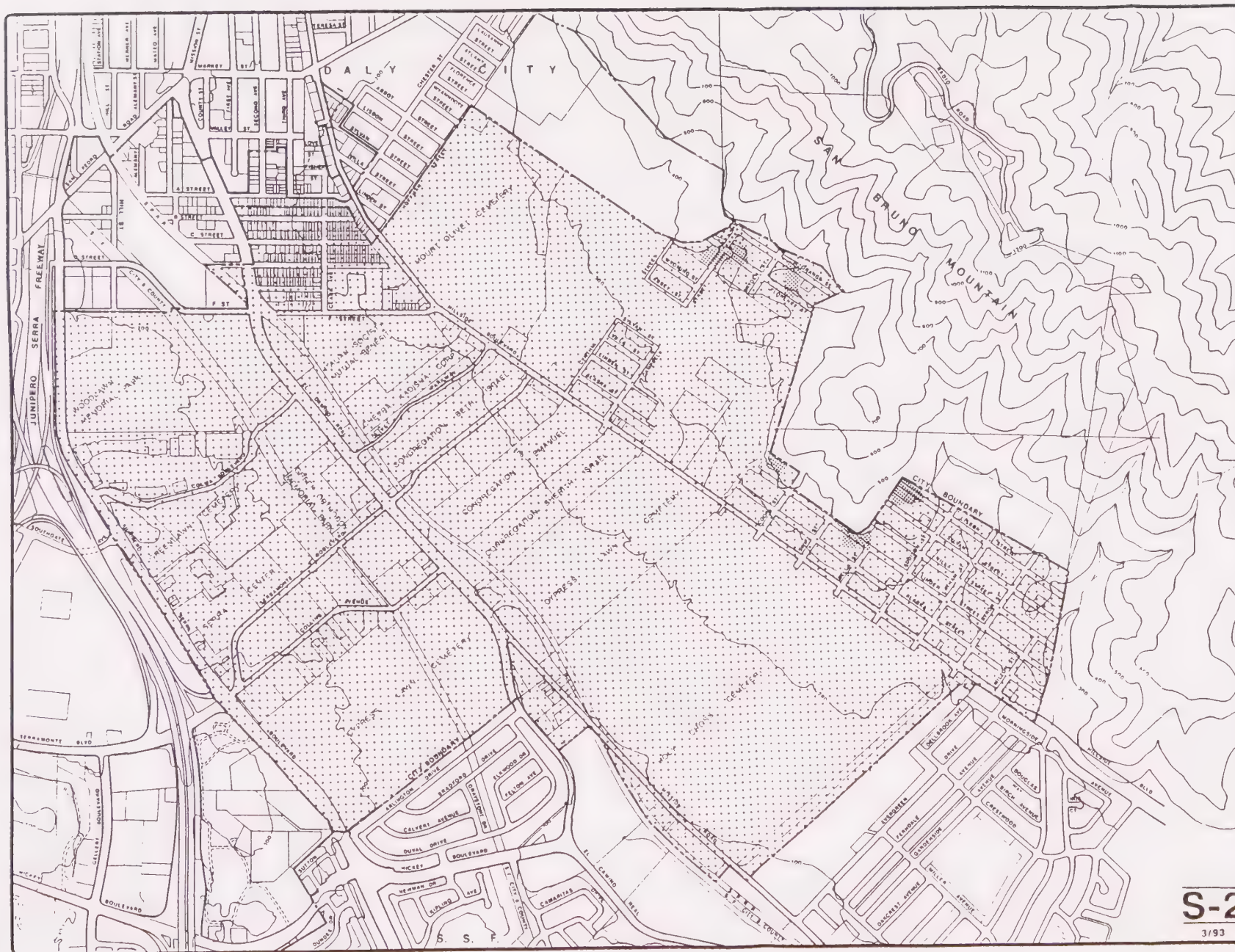
3.000 SEISMIC HAZARDS

3.100 Seismic History. There are no known active or potentially active faults within the Town of Colma. Two inactive faults have been located within Colma, Exhibit S-3. The San Bruno Fault is a concealed/inferred fault that runs northwest to southeast through the center of Colma. The existence of this fault, however has since been disputed. Further investigations by Bonilla (1959) indicated an unconformity within the Merced Formation and folding negating the evidence of the fault.

The Hillside Fault trace is located to the northeast of Colma along the southern base of the San Bruno Mountains. This fault, mapped by Bonilla (1971), separates the fairly coherent sandstone blocks of the San Bruno Mountain to the northeast from the extensively deformed sandstone and shale of the Franciscan assemblage to the southwest and has not had any apparent movement in over two million years. Seismic information is insufficient to determine the present activity of either the San Bruno or Hillside faults. Both of these faults are close to the San Andreas Fault and, therefore, historic activity cannot be differentiated. The San Andreas Fault has had historic surface faulting (including tectonic creep), and continues to be the locus of historic damaging earthquakes.

The entire San Francisco Bay Area is subject to occasional very strong earthquakes that originate on the San Andreas Fault, and from the Hayward and Calaveras Faults in the East Bay. Historic records show that severe shocks have affected the area in 1836, 1838, 1865, 1906 and October 17, 1989. There is a strong possibility that the Town of Colma will experience the effects of an earthquake as large or larger than the 1989 earthquake within the lifetime of most of the present residents. Most geologist and seismologists agree that a large earthquake is likely to occur on the Hayward Fault or the San Francisco Peninsula segment of the San Andreas Fault.

3.200 Seismic Hazards. Seismically induced hazards with potential to affect Colma include ground shaking, ground failure, liquefaction and surface rupture. The likelihood, severity and location of any of these seismically induced hazards occurring in Colma depends upon the specific site's geology, topography, soil type, weather and intensity of development. The Geologic, Seismic-Shaking, and Hazards Maps, Exhibits S-1, S-2, and S-3 provide a basis



TOWN OF COLMA GENERAL PLAN

PREDICTED SEISMIC-SHAKING INTENSITIES

MODIFIED MERCALLI INTENSITIES*



* Refer to Appendix 6.100 for a description of the Modified Mercalli Intensities.

NOTE: The location and shape of the area shown are approximate only. Further geologic testing should be conducted for proposed development, as required by the City Engineer.



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SOURCE: U.S.G.S Map 1-1257-H

S-2

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TOWN OF COLMA GENERAL PLAN

HAZARDS MAP

 APPROXIMATE LOCATION
OF AN INACTIVE FAULT
(Concealed)

★ SMALL LANDSLIDE

LANDSLIDE SUSCEPTIBILITY

 VERY LOW (I)

 LOW (II)

LIQUIFICATION SUSCEPTIBILITY

 LOW

 MODERATE TO LOW

 SAN FRANCISCO WATER
PIPELINE (Underground)

● WATER TANK AND
DIRECTION OF SPILLED
WATER FLOW

 AREAS SUBJECT TO
FLOODING

SOURCES:

- 1) Map Showing Liquification Susceptibility, USGS, 1987
- 2) Landslide Susceptibility, USGS, 1972
- 3) Geotechnical Hazard Synthesis Map, County of San Mateo, 1973
- 4) Town's Constraint Map

SCALE IN FEET
0 400 800 1200

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S-3

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for evaluating potential hazards in Colma, and for requiring a geotechnical study or special engineering, architectural, or site design consideration. The seismic hazards are described below.

3.210 Ground Shaking. The primary effect of an earthquake which may be experienced in Colma is the ground shaking for up to one minute. The intensity of shaking is measured by the logarithmic Richter scale or rated using the Modified Mercalli index. The shaking may cause sliding and tipping over of furniture, falling of objects from shelves, and collapse or partial collapse of weak masonry structures such as water tanks and chimneys. The effect of a Richter magnitude 8.3 earthquake, similar to the 1906 earthquake on the San Andreas fault, would produce, in Colma, a Modified Mercalli Intensity Scale rating of IX. An explanation of this rating system is in Appendix 6.100 and mapped on Exhibit S-2.

Most of the homes in Colma are single family dwellings that are of standard wood frame construction. Wood frame houses typically have a good record of performance in strong earthquakes although older homes frequently experience chimney failure. Generally, unreinforced masonry structures are least able to withstand the lateral force of an earthquake. (Refer to Section 3.211, Hazardous Buildings). The areas most affected by ground shaking are flats, alluvial and filled areas where liquefaction may occur.

3.211 Dangerous Buildings

A dangerous building is one that might pose potentially serious risk of loss of life and injury, or of severe curtailment of community services in case of a damaging earthquake. Structures built prior to the 1940 seismic safety building requirements typically pose the most serious threat to life and safety.

Buildings which can be considered dangerous have exterior parapets and ornamentation subject to shaking loose in an earthquake, unanchored exterior walls or sheathing on roof or floors incapable of withstanding lateral loads. Structures exhibiting these characteristics have not been individually identified, however, owners of buildings constructed prior to 1933 should have the structures examined by a licensed engineer or architect and should undertake improvement of structures to ensure seismic safety. The Town's Municipal Code (Section 5.407) calls for the removal of dangerous buildings as specified by the National Construction Codes. These buildings are a public nuisance which require either repair, rehabilitation, or demolition. When a property owner requests any kind of permit from the Town, their building will be evaluated for its safety. If the Town Building Official suspects the building to be unsafe, the Town will require the owner to have the building inspected by a licensed engineer or architect, and take the necessary actions to make the building safe.

3.220 Ground Failure. A secondary effect of an earthquake is ground failure, which may occur anytime after an earthquake or aftershock. Seismic ground failures are caused by the soil losing its structural integrity through liquefaction, surface ruptures, lurching and settling. Historic data indicates that

ground failures could occur along Colma Creek, the westerly edge of Sterling Park, the slopes behind the auto dealers north of Serramonte Boulevard, and along the steeper slopes abutting San Bruno Mountain.

3.221 Liquefaction. Liquefaction is a common phenomena during major earthquakes. Liquefaction is the temporary transformation of saturated cohesionless soils, such as sand, silt or gravel, to a liquefied state as a result of seismic ground shaking. Liquefaction typically occurs where the groundwater level is high and increased pressure from the seismic ground shaking restricts the ability of the water to drain away. The trapped water saturates the soil and the soil loses its ability to support the downward load of a structure, causing buildings and foundations to sink and ground shaking to intensify. The relative liquefaction susceptibility and probability of susceptible sediment in subsurface materials is low in most of Colma where relatively deep aquifers in the area decrease the chances of liquefaction.

3.222 Surface Rupture. It is unlikely that surface faulting with ground ruptures will occur in Colma because the mapped faults within or in very close proximity to Colma are not known to be active. Surface rupture is typically limited to a narrow zone along the fault which is undergoing rupture. This would be expected to occur along the main trace and major active branches of the San Andreas Fault. Site specific geologic reports required for specific projects may identify minor fault traces. If so, specific recommendations of the geotechnical engineer should be followed.

3.223 Lurching and Settlement. Lurching is the movement of ground materials toward a free face such as a cliff or stream bank. The earthquake forces cause earth to move in the unsupported direction and results in cracks in the ground generally paralleling the exposed bank or stream. Lurching is not related to liquefaction, however it may cause similar structural damage. Roads, structures and patios should be positioned a safe distance away from the top and bottom of banks and cut slopes to minimize damage caused by lurching.

Differential settlement or compaction occurs when earthquake forces cause ground materials to become more dense. This can occur in both dry and water saturated granular soils. In saturated soils this occurs when the water drains away, allowing densification. Variations in the types of soil locally contribute to differential settlement. Structural damage is caused when settlement occurs and different parts of a structure suddenly are non-uniformly supported by the ground below. Buildings should be properly designed and engineered to minimize the impact of the ground settling.

3.230 Seismically Induced Flooding. Seismically induced flooding may result if water tanks fail or if the San Francisco Water Department's pipeline is broken during an earthquake. The failure of water tanks located in the foothills of San Bruno Mountain may cause flood damage to cemeteries along Hillside Boulevard and some residences within the City of South San Francisco and Daly City. The failure of San Francisco's water pipeline will not result in a catastrophic flood. If the pipeline was completely sheared off during an earthquake the immediate area might be washed out before the Water Department's

maintenance crew could shut off the valves to stop the flow of water. The water line through Colma is at a higher elevation than Colma Creek; a break in the pipe would likely result in the water flowing into Colma Creek, thereby limiting the extent of localized flooding. In an effort to reduce the likelihood of the water tanks or San Francisco's water pipeline from flooding areas of the Town, the Town should request that responsible agencies, or entities inspect these facilities to ensure that the supports for water tanks and water pipelines are in good condition to withstand an earthquake.

4.000 COMMUNITY SAFETY

4.100 FLOOD HAZARDS

Most flooding in the Bay Area is generally classified as flash floods. Flash flood conditions typically occur when a moderate rainfall is followed by a heavy rainstorm. The moderate rainfall saturates the soil allowing minimal additional infiltration. Increased urbanization in the Bay Area has increased the amount of impervious areas and reduced the amount of groundwater infiltration thereby resulting in increased levels of water runoff and flooding potential.

The Town of Colma is bisected by Colma Creek which is part of a watershed drainage basin defined by San Bruno Mountain on the east and the ridge traced by Skyline Boulevard on the west. Colma Creek flows through the center of Colma and continues through South San Francisco to the Bay. Colma Creek is part of the San Mateo County Flood Control District. The Colma Creek Flood Control Zone covers approximately 16.3 square miles including the Town of Colma as well as portions of the Cities of Pacifica, Daly City, San Bruno and South San Francisco.

Flooding has occurred frequently at El Camino Real and F Street, and on El Camino Real at Mission Road. And, in the past, other segments of Colma Creek have overflowed. Improvements to the Colma Creek drainage channel over the past decade have reduced the creek flooding. Accordingly, Colma has been determined by the Federal Emergency Management Agency (FEMA) to be only minimally flood-prone and therefore not included on FEMA's official Flood Zone Maps. To maintain FEMA's rating several General Plan policies are provided to ensure that runoff levels do not adversely impact the capacity of Colma Creek. In addition, the Town is currently working with impacted property owners to resolve the flooding problem at El Camino Real and Mission Road wye, and the Town has approached CalTrans about the undersized culvert at El Camino Real and F Street. The Town installed a larger box culvert under Serramonte Boulevard, as part of the street reconstruction program in 1991, to increase the capacity of the storm drainage system.

4.200 FIRE HAZARDS

Fire hazards pose a threat to life and property. Urban fire hazards include buildings, automobiles, rubbish and unkept vacant lots. Wildland fire hazards include uncultivated land, timber, range, brush and grass lands in undeveloped

areas. The Town of Colma has a Fire Protection Program through the Colma Fire Protection District (CFPD) to minimize the risks of urban and wildland fires.

4.211 Urban Fire Hazards. Fires in urban areas pose the greatest threat to life and property due to the proximity of people and structures. The types of structures posing the most significant fire hazards within the City are structures built prior to 1940 which have sub-standard wiring and heating systems. Other sites of fire concern are unmaintained public utility easements, sites with large amounts of fuel and combustibles storage, and most unmaintained or poorly maintained buildings regardless of age.

4.212 Wildland Fire Hazards. The California Department of Forestry (CDF) determines the degree of wildland fire hazard based on the natural setting of the area, the degree of human use of the area, and the level and ability of public services to respond to fires that do occur. The CDF has rated the San Bruno Mountain Park and the adjacent undeveloped areas of Colma as areas of moderate fire hazard. Fires in these areas usually occur during the summers primarily where grass and brush grow. The CDF responds to wildland fires from a number of stations, depending on their proximity and availability. The closest station is at 20 Tower Road in Belmont. Undeveloped areas within Colma are not "Wildland Areas" as defined by the California Department of Forestry, but CDF criteria may be used to identify and evaluate fire hazards in these areas which are CFPD's responsibility.

4.220 Fire Control Services. The Colma Fire Protection District (CFPD), provides fire protection to the Town of Colma and the surrounding unincorporated areas. The Colma fire station is located north of Town at Reiner Street near San Pedro Road. The station is manned by thirty-five volunteers and one salaried part-time Fire Marshal-Assistant Chief.

Equipment available to the Fire District includes three engines each with 1,500 gallons per minute (gpm) pumping capacity, one reserve engine rated at 1,000 gpm, one 75 foot aerial ladder truck and one squad truck. If the unincorporated area where the Colma Fire Station is located is annexed to the City of Daly City, the existing fire protection facilities could continue to operate from its existing location or relocate to a more central location within the District's newly defined boundaries. The Colma Fire District will continue to serve the Town of Colma as long as the Town wants. The Fire District can only be dissolved if its service area is limited to the Town of Colma and the Town elects to operate their own Fire Department.

The Colma Fire Protection District currently has an average response time of two to four minutes to sites in the Town of Colma. The time it takes to respond to an emergency is important because of the critical care period (seven to eight minutes) needed for physical health emergencies, and of the increasing intensity and spread of fire. Mutual aid agreements with other cities and departments ensures that additional fire protection support is available for a greater alarm fire which seldom occurs.

Colma's fire protection services are evaluated by the Insurance Service Office (ISO), whose ratings establish the fire insurance rates paid by local residents and businesses. ISO rating is partially based on such factors as available water supply, manpower and equipment. Colma Fire District's ISO rating is V on a scale of I-X (best to worst) which is an improvement from their previous rating of VI.

The Town's Fire Protection Program includes plan check and inspection of new structures and remodels in the City. Plan check by the Fire District assures adequate fireflow levels, general access, turnarounds, and other relevant fire protection measures as well as ensuring that building sites can be readily identified by street names and address numbers. Additional requirements may be the installation of automatic sprinkler systems in all structures 3,000 square feet or more in floor area, or more than two stories in height, or 30 feet or more in height, and any other requirements imposed as conditions of approval for a project by the Fire Chief. The Fire Protection services offered by the District also include public education programs and building inspection programs. Speakers from the District are generally available to schools and the public for information on fire prevention and protection.

4.230 Mutual Aid. Colma Fire District has mutual aid agreements with Daly City, San Bruno, Pacifica, South San Francisco and Brisbane. The Fire District's Mutual Aid agreements provide for more rapid response to structural fires in areas within the Fire District when requested. When additional help is needed by the Colma Fire District or Police Department, the San Mateo County, Central and South strike teams or County offices, respectively, may be called in. Mutual aid agreements for both the Fire District and the Colma Police Department provide service anywhere in neighboring jurisdictions when that assistance is specifically requested.

4.240 Peak Load Water Supply. The required peak load water supply is the amount of water necessary to suppress fire in a structure during peak water use periods. Fire flow requirements are expressed in gallons per minute (gpm), and are determined by type of construction, and size (square footage). The Colma Fire District and Uniform Fire Code requires that all structures have fire flows of no less than 1500 gpm and possibly more in a non-sprinklered building. In order to meet this requirement, the Town and Fire District often includes mitigation in the building construction. Mitigation may include fire rated walls, an automatic sprinkler system, and other measures which reduce or eliminate potential fire hazards.

4.300 HAZARDOUS MATERIALS

"Hazardous materials" include toxic metals, chemicals, and gasses; flammable and/or explosive liquids and solids; corrosive materials; infectious substances; and radioactive materials. The accidental release of a hazardous material to the environment could cause a multitude of problems, the significance of which is dependent on the type, location, and quantity of the material released. There are numerous State and Regional agencies that oversee and monitor the use and disposal of hazardous materials. The efforts of these

agencies as well as those of Colma's will serve to reduce the risk associated with hazardous material.

The Tanner Bill¹ acknowledged that hazardous waste management is a responsibility which must be shared by all communities. Consequently, San Mateo County prepared the San Mateo County Hazardous Waste Management Plan, which Colma adopted. The goals of the Plan are to ensure that hazardous waste is managed to protect public health and safety and preserve the County's economic viability; to reduce the amount of hazardous waste generated in San Mateo County; to promote public confidence in government and industry's ability to safely manage hazardous waste; and to encourage cooperation between government, industry and the public when planning for hazardous waste management.

Pretreatment and disposal through the sewage system is the predominant form of authorized hazardous waste disposal. However, illegal disposal of hazardous waste is a concern which must be addressed. Small generators, including small businesses and households, are the parties primarily responsible for illegal disposal of hazardous waste into sewer systems, at landfill sites, and directly into streams, or dumping along roadways. Federal and State laws have put into place a program to regulate stormwater discharge from certain industrial activities. State and Regional Water Resource Boards are administering the Federal program - National Pollutant Discharge Elimination (NPDES), however the State's Permit is called the General Industrial Activities Stormwater Permit. The program requires specific industrial activities to obtain a NPDES - General Permit. Each permit holder must, among other things, develop and implement a Stormwater Pollution Protection Plan (SWPPP) and a Monitoring and Reporting Program Plan. This program will reduce the amount of pollutants entering the storm drainage system and curtail illegal disposal of hazardous waste into the system.

4.310 Hazardous Material Sites. Colma's hazardous materials storage sites are regulated through the San Mateo County Department of Environmental Health. The County issues permits for underground tanks, hazardous waste generators, and hazardous materials users regulated by Health and Safety Code - Chapter 6.5, Section 25500 to Division 20. The County regularly inspects the underground tanks in Colma which are predominantly gasoline storage tanks for service stations and vehicle yards. Commercial and industrial facilities where hazardous waste is generated and stored for less than 90 days are also inspected and monitored by the County Environmental Health Department.

Although the County's permitting procedures are adequate, the Town should be more involved with the management of facilities storing, generating or handling hazardous materials. An inventory of hazardous materials sites within the Town should be compiled and the Town should follow up to see that County permits for the storage and handling of such materials are obtained. Hazardous

¹ Government Code Section 6596.1 and 66780.8 and Health and Safety Code Sections 25117.7, 25117.2, 25117.5, 25200.1, 25200.2 and Article 3.5 and 8.7 in Chapter 6.5 of Division 20.

materials incidents can be handled adequately by the Town's Police Department and the Colma Fire District. Additional support or equipment for a hazardous incident is also available if necessary, through the joint effort of other local and state agencies. Hazardous materials programs adopted by the Town should include continuance of existing programs such as training of police personnel in hazardous materials management and ensuring that businesses are permitted through the County.

State and Regional agencies monitor hazardous material storage sites and generators. The 1992 State list of Hazardous Waste and Substances sites and the County's Fuel Leak list includes several sites in Colma. The hazardous waste contaminated sites in Colma include leaking underground tanks at two gas stations, two cemeteries and a nursery. Appropriate State and County agencies are overseeing the remediation of the contamination. In most cases the leaking tanks have been or will be removed, the soil is tested for contamination and the contaminated soil is removed, the site is backfilled with clean soil and groundwater monitoring wells are installed. New installations use double wall tanks as required by the Uniform Fire Code. In addition, the placement of tanks are inspected and approved by the Colma Fire Protection District.

Landfill sites have the potential of contaminating the groundwater and air, and for producing hazardous gases. The Bay Area Air Quality Management District (BAAQMD) and the Regional Water Quality Control Board (RWQCB) oversee the management and closure of landfill sites to protect the public's health and safety. Landfill sites are designed to avoid water contamination by using clay and synthetic liners, laying refuse over clean soils, and by installing leachate systems and groundwater monitoring wells. Gas recovery systems are used to collect and burn the landfill gases (especially methane gases) which otherwise can be odorous and present a fire and explosion hazard. Gas probes are placed on-and off-site to ensure that the gases are not migrating laterally. Both landfill sites in Colma, the active Hillside Landfill and the closed Junipero Serra Disposal Site, have groundwater and gas recovering systems which are routinely monitored by the landfill operator and by the property owner's civil engineer, to ensure that these systems are functioning correctly. The Colma Fire Protection District also routinely inspects the gas recovery systems. The landfill and gas monitoring systems are designed to resist earthquake forces. However, a catastrophic earthquake may cause the landfill liner and cap to rupture, fill material may move with the earth's movement and the gas recovery system may be damaged. These failures would not pose an immediate hazard. However, the landfill cap and gas recovery system should be repaired as soon as possible.

4.320 Handling and Transport. The California Department of Health Services monitors the transportation of hazardous waste through a manifest system which is used to trace all hazardous waste transported off-site to storage, treatment, or disposal facilities. Most hazardous waste generated in Colma is transported to recycling companies. Hazardous waste generated outside of Colma may be transported through the Town on Interstate 280 and Highway 82 (El Camino Real).

The California Highway Patrol and CalTrans are responsible for controlling transportation of hazardous materials and scene management in the event of a spill on a State or Federal highway. The Colma Fire Protection District would respond to a local hazardous material spill. The Town's Police Department may assist in emergency actions. Procedures to be followed in the event of a hazardous spill are outlined in the San Mateo County Hazardous Waste Management Plan. Upon request by the Colma Fire Protection District, the County's Hazardous Material (HAZMAT) response team may respond to the incident. The HAZMAT response team is funded through the San Mateo Operational Area Office of Emergency Services.

4.400 AIRPORT SAFETY

An aircraft incident can occur anywhere, however, incidents which affect life and property on the ground are more likely to occur in areas immediately surrounding airports. The San Francisco International Airport (SFIA) which is the sixth busiest airport in the world is located approximately 3.5 miles southeast of Colma. Aircraft taking off from SFIA fly over San Bruno, South San Francisco, and Daly City in what is referred to as the gap. The gap, as it traverses these cities, is 1.2 miles wide and 5.8 miles in length. This aircraft swathe encompasses the entire Serramonte neighborhood of southern Daly City, central San Bruno and South San Francisco and is directly adjacent to the Town of Colma.

4.410 Airport Safety. The State Legislature, in 1970, required the establishment of Airport Land Use Commissions (ALUC) within counties to develop plans for land uses around airports. The purpose of the ALUC is to provide for the orderly long-term growth of airports and their surrounding areas, as well as to protect the people who live near airports and the welfare of the public in general. The San Mateo County Airport Land Use Commission has set safety standards specifying how land near San Francisco Airport can be used based on safety and noise considerations, height restrictions for new construction, and construction standards for buildings.

The San Francisco International Airport has designated transitional surfaces as alternate routes for planes to take off or land. The "gap" has been designated as an approach surface with transitional surfaces extending on either side.

One of these transitional surfaces extends over Colma. Any development in the transitional zone must be in compliance with ALUC maximum height standards. The structure/building height restrictions under the Transitional surfaces for Colma are approximately 400 feet above average mean sea level. This height limit will not constrict development in Colma which is roughly at 110 feet above sea level and where the normal commercial height limit is 50 feet.

4.500 EMERGENCY OPERATIONS

4.510 Emergency Programs. An emergency is a life, property, or environment-threatening incident, particularly one which occurs suddenly or unexpectedly. The resulting damage is determined by the nature of the incident and the

response to it. The reaction to an emergency is often the major determinant of the severity of its impact. The Town can minimize threats to public safety by ensuring its capability to adequately respond to potential emergencies, Appendix 6.300.

The Town of Colma with the aid of San Mateo County has prepared a Multihazard Functional Plan (MHFP, October 1987) as required by the California Emergency Services Act. The Plan defines the Town's planned response to emergency situations and assigns emergency tasks to Town personnel, provides operational guidelines, and inventories equipment, supplies, and personnel available for emergency response. The Town's Emergency Operations Center is located at the Police Department at Town Hall on El Camino Real. The center contains a kitchen, emergency supplies and equipment and would serve as a communications and administrative headquarters. In the event this location is not functional, the Emergency Operation Center could be at the proposed Community Center on F Street. The Colma Fire District has facilities to function as an operational headquarters for emergency response personnel and equipment. Their facilities include a generator, fuel tank, kitchen and sleeping quarters.

Additional emergency resources are available to the Town through the San Mateo Operational Area Emergency Services organization. The San Mateo Operational Area Emergency Services Organization was formed through a joint powers agreement to coordinate interjurisdictional operations and coordinate mutual aid among San Mateo County and its twenty cities.

4.520 Evacuation Plans and Transportation Failures. In the event of an emergency, the Colma Police Department, assisted by the Town's Public Works Department, would establish evacuation routes and maintain traffic control. Responsibilities and tasks for evacuation are assigned in the Town's Multi-hazard Functional Plan. The Circulation Element identifies the major roads which would serve as principal routes for evacuation of people out of hazardous areas and to safety. These routes may also serve as the principal routes for movement of emergency equipment and supplies to the incident scene.

5.000 SAFETY GOALS, POLICIES AND IMPLEMENTING PROGRAMS

5.100 SEISMIC AND GEOLOGIC

- 5.110 Goal. Protect the community from damages to life and property caused by catastrophes related to seismic activity or geologic conditions.
- 5.111 Policy. Continue to investigate the potential for seismic and geologic hazards as part of the development review process and maintain this information for the public record. Update Safety Element maps as appropriate.
- 5.112 Policy: Require geotechnical, soils and foundation reports for proposed projects which warrant them according to the Safety Element and its Geologic and Hazard Maps, the County's Seismic and Safety Element; and the Town's Building Official and Zoning Ordinance and Building Codes.

- 5.113 Policy: Prohibit development - including any land alteration, grading for roads and structural development - in areas of slope instability or other geologic concerns unless mitigation measures are taken to limit potential damage to levels of acceptable risk.
- 5.114 Policy: Design and improve all critical care facilities and services to remain functional following the maximum credible earthquake. Avoid placement of critical facilities and high-occupancy structures in areas prone to violent ground shaking or ground failures.
- 5.115 Policy: Require that all buildings on properties which are requesting any kind of permit from the Town, shall be evaluated to determine if it is unsafe per Municipal Code 5.407. If the building is suspected to be unsafe, the property owner will be required to have the building inspected by a licensed engineer or architect, and take the necessary steps to make the building safe.
- 5.116 Policy: Work with San Mateo County, California Water Service Company and the San Francisco Water District to ensure that all water tanks and San Francisco's main water pipeline are capable of withstanding high seismic stress.
- 5.200 FLOODING
- 5.210 Goal: Minimize the occurrence of flooding conditions in the Town of Colma from stormwater runoff.
- 5.211 Policy: Design and construct drainage facilities to improve the flow capacity of Colma Creek within the Colma limits in order to accommodate the storm water runoff generated by a 100-year storm.
- 5.212 Policy: Reduce localized flooding through City funded drainage system improvements; seek alternate funding where possible.
- 5.213 Policy: Continue to require the habitable portions of new structures to have a finished floor elevation 1.5 feet above the projected 100-year water surface or to be adequately protected from flooding, as defined in the Municipal Code (Section 5.335).
- 5.214 Policy: Continue to require all new developments which contribute runoff to Colma Creek to include on-site storm water retention facilities which have the capacity to store the difference between a 10-year predevelopment storm and a 100-year post development storm.
- 5.300 FIRE SAFETY
- 5.310 Goal: Continue to support the Colma Fire District in their efforts to ensure an adequate level of fire protection and life safety protection in Colma.
- 5.311 Policy: Support the Fire District as they strive to improve the District's ISO rating by whatever means possible.

- 5.312 Policy: Ensure that all buildings have visible street numbers and are accessible to fire vehicles and equipment. A minimum 20 foot wide fire lane must be provided to all commercial and large scale residential facilities.
- 5.313 Policy: Assist the Fire District's efforts to continue to maintain an average response time of two to four minute range to all locations in Colma.
- 5.314 Policy: Continue to have the Colma Fire Protection District reviewing development plans and to confirm that the plans conform to the Uniform Fire Code and Title 24 of the California Building Code.
- 5.315 Policy: Support the Fire District's continued programs of fire prevention and public education about fire safety.
- 5.316 Policy: Encourage the Fire District to continue to participate in the mutual aid agreements with Pacifica, Daly City, San Bruno, South San Francisco, Brisbane and the San Mateo County Fire Chiefs Association County Wide Plan.
- 5.317 Policy: Consider a site for the Fire District in the vicinity of Hillside Boulevard and Serramonte Boulevard if the present facilities of the Colma Fire Protection District must be relocated.
- 5.400 HAZARDOUS MATERIALS
- 5.410 Goal: Protect the community's health, safety, welfare, and property through regulation of authorized (and elimination of unauthorized) use, storage, transport, and disposal of hazardous materials, with specific emphasis on problem prevention.
- 5.411 Policy: Support County efforts to locate, regulate and maintain information regarding hazardous materials located or transported within the Town.
- 5.412 Policy: Collect and maintain a list of locations in Town where hazardous materials are used.
- 5.413 Policy: Promote measures aimed at significantly decreasing solid waste generation including community recycling. Require recycled materials storage and collection areas in all new developments.
- 5.414 Policy: Promote public awareness of safe and effective hazardous waste use, storage and disposal; utilize the Town newsletter to inform residents.
- 5.415 Policy: Continue permitting of hazardous material sites in the Town through the San Mateo Department of Environmental Health Inspection Program.

5.500 EMERGENCY OPERATIONS

- 5.510 Goal: Minimize potential damage to life and property resulting from natural and man-made emergencies, through emergency preparedness and response programs.
- 5.511 Policy: Maintain the Colma Multi-Hazard Plan and continue to participate with San Mateo County's Mutual Aid Programs, Area/ County Emergency Plan, and Operational Area Emergency Services Organization as a basis for community emergency preparedness.
- 5.512 Policy: Continue to analyze the significant seismic, geologic and community wide hazards as part of the environmental review process; require that mitigation measures be made conditions of project approval.
- 5.513 Policy: Utilize emergency evacuation routes determined by the Police Chief. Generally speaking, the evacuation routes will follow the major roadways as set forth in the Circulation Element.
- 5.514 Policy: Promote awareness of the Town's emergency operations procedure; utilize the Town's newsletter to inform residents.
- 5.515 Policy: Improve inter-jurisdictional, inter-agency cooperation with other public and private agencies for safety in future land use planning, hazard prevention and emergency response.
- 5.516 Policy: Establish an alternative Emergency Operations Center, if the City Hall is not operational, at the proposed Community Center on F Street.

5.600 PROGRAMS FOR SAFETY ELEMENT IMPLEMENTATION

Listed below are the programs for Plan Implementation. All are existing programs. Reference is made to the safety policies affected by the program.

California Environmental Quality Act (CEQA) Environmental Review Procedure. The initial study for any applicable project takes into account the effects of the project on available safety resources and the relative safety of the project itself. Mitigation measures are made conditions of project approval.

Subdivision Ordinance. The Subdivision Ordinance sets forth minimum standards for land division, site preparation and facility design. Soil and geotechnical reports may be required by the City Engineer.

Municipal Code. The Colma Municipal Code requires all new and remodeled projects to comply with Building Code requirements, Fire Code requirements, and other Town ordinances such as the requirements for soil or geologic reports, and unsafe buildings.

Inspection of Buildings. The Fire District's Building Inspection Program includes enforcement of current fire and building code requirements. The Fire District and the Building Inspector are responsible for the identification of hazardous buildings and proper structural maintenance of critical care facilities or services.

Project Review. Proposed projects are reviewed by the Building Official, City Planner, City Engineer, and Police and Fire District personnel. This procedure provides information for use in design review and the conditioning of permits for new development.

San Mateo Operational Emergency Services Organization. This organization is derived from a County Joint Powers Agreement, and, therefore, attempts to manage and coordinate emergency operations among the various cities. Colma continues to participate.

Multihazard Functional Plan. This Plan outlines the Town's planned response to emergency situations. Emergency response is administered by the Police and Fire Departments. Colma's emergency control center is located in the Police Department at City Hall.

Colma Fire Protection. The program involves building and site inspections as well as public education.

San Mateo County Major Air Crash/High Risk Plan. This plan specifies initial notification and response assignments in regard to a major airliner accident or high rise fire in the County.

San Mateo County Hazardous Waste Management Plan, San Mateo County Hazardous Materials Area Plan. These plans serve to monitor the use, storage and transportation of hazardous materials as well as prepare for and respond to the release of a hazardous material.

Mutual Aid Programs: Local cities and the County utilize mutual aid programs to respond to major emergencies.

APPENDIX 6.100 MODIFIED MERCALLI INTENSITY SCALE (EXCERPT)

- V. Felt indoors and outdoors by nearly everyone; direction estimated sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset; some dishes and glassware broken. Doors swing; shutters, pictures move. Pendulum clocks stop, start, change rate. Swaying of tall trees and poles sometimes noticed.
- VI Felt by all. Damage slight. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks and books fall off shelves; pictures off walls. Furniture moved or overturned. Weak plaster and masonry cracked.
- VII Difficult to stand. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in badly designed or poorly built buildings. Noticed by drivers of automobiles. Hanging objects quiver. Furniture broken. Weak chimneys broken. Damage to masonry; fall of plaster, loose bricks, stones, tiles, and unbraced parapets. Small slides and caving in along sand or gravel banks. Large bells ring.
- VIII People frightened. Damage slight in specially designed structures; considerable in ordinary substantial buildings, partial collapse; great in poorly built structures. Steering of automobiles affected. Damage or partial collapse to some masonry and stucco. Failure of some chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved off foundations if not bolted down; loose panel walls thrown out. Decayed pilings broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
- IX General Panic. Damage considerable in specially designed structures; great in substantial buildings; with some collapse. General damage to foundations; frame structures, if not bolted, shifted off foundations and thrown out-of-plumb. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground; liquefaction.
- X Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Landslides on river banks and steep slopes considerable. Water splashed onto banks of canals, rivers, lakes. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.

APPENDIX 6.200 EARTHQUAKE POST-DISASTER RESPONSE PROGRAM

One of the major goals of a community should be to relieve fear after an earthquake. The following is a post-disaster response program designed to alleviate community fear. It involves 14 tasks to be implemented by local authorities:

- 1) Select a Crisis Response Team. This involves three to five people who are given authority to make decisions before and during the time of crisis. For Colma the crisis response is first administered by the City Manager and Police Chief.
- 2) Media Liaison. The Police Chief is the media coordinator and he would handle all contact with reporters and will prepare press releases for the media. He will determine, with the City Manager, what information to make available. The policy here is the less publicity death and injury receive, the better. The Colma Fire District also has a Public Information Officer.
- 3) Family Liaison. The Police Department and Assistant City Manager will make immediate and appropriate contact with families of dead or injured individuals in order to express the Town's concern, and to offer support in terms of access to community resources, counseling, provision of food and/or child care.
- 4) Grief Crisis Counselor. The Police Chief who is trained in grief and trauma shall assist with the development and review of the response plan, address emergency staff meetings, and will be available directly after the disaster.
- 5) Community Counseling Specialists. Colma's Police Officers are trained in counseling. The Police will be deployed into the community after a disaster to provide necessary counseling and assistance.
- 6) Organize a Staff Telephone Tree. The Police Department's dispatchers will notify the Police Chief and the City Manager as soon as possible after a disaster, and give them the basic facts, and time and place for an emergency staff meeting.
- 7) Develop Suggestions for Staff Discussion. The first work day after the disaster should involve a thorough discussion of what has transpired. The Police Chief will report pertinent facts, describe the schedule for the day, and mention people and places from which help is available. It is important to reduce rumors and gossip, and to provide a sound basis for processing and grieving.
- 8) Set Aside a Crisis Center and Counseling Room. The Police Department's dispatch operators' room will serve as the crisis headquarters and information center. Each of the operators is trained in crisis

CHAPTER 10: THE HISTORY OF THE UNITED STATES

The first part of the chapter discusses the early history of the United States, from the time of the first European settlers to the American Revolution. The second part discusses the period from the Revolution to the Civil War, and the third part discusses the period from the Civil War to the present.

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2. The second part of the chapter discusses the period from the Revolution to the Civil War. This period is characterized by the growth of the United States as a nation, the development of a federal government, and the struggle for civil rights.

3. The third part of the chapter discusses the period from the Civil War to the present. This period is characterized by the growth of the United States as a world power, the development of a modern economy, and the struggle for civil rights.

4. The fourth part of the chapter discusses the period from the Civil War to the present. This period is characterized by the growth of the United States as a world power, the development of a modern economy, and the struggle for civil rights.

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counseling. If the Police Department's facilities are not operational, then the alternative site could be the proposed Community Center on F Street.

The Police dispatch operators will be available after the disaster to answer the phone, field questions, and relay information requests to other authorities. In addition, the City Council office room at City Hall will be used for individual or small group counseling.

- 9) Policy on Town Employee Deaths. The Town's City Council will have a moment of silence to observe the death of a Town employee.
- 10) Determine Policy on Memorials. The City Manager, Police Chief and Mayor will determine what sort of memorial is appropriate for deceased staff members and if a plaque or tree dedication is appropriate. Flying the flag at half-mast is determined by the national flag directive. The flag may be flown at half-mast as requested by the President of the United States, the Governor of California, a San Mateo County or Town of Colma official.
- 11) Acquire Helpful Books. The City Clerk should make publications available regarding the disaster agent, other people's reactions to death, death itself, the grieving process and how to be helpful to others who are similarly upset.
- 12) Arrange for Flex-Time: The crisis response team and Town management should prearrange and allow for flexible hours as needed.
- 13) Arrange for a Community Meeting: The City Manager, Police Chief and other crisis response team members should all be prepared to speak at a meeting for the community to be convened shortly after the disaster. Explaining what to expect during the grieving process and how to be helpful to others in the midst of it is helpful to the community members.
- 14) Evaluate the Performance of the Preceding Steps. A few weeks following the disaster, life will have returned pretty much to normal, particularly if there are few visible signs of the disaster damage. When most staff and community are functioning in their usual fashions, the crisis response team should turn its attention to evaluating how it did. Organize a meeting of those most centrally involved in carrying out the plan, prior to the meeting solicit opinions from others more peripheral, review all the information on performance, and decide what worked, what did not, what changes would improve the plan.

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research.

2. The second part of the report is a detailed description of the methodology used in the study. It includes information about the sample, the data collection methods, and the statistical analysis.

3. The third part of the report is a discussion of the results of the study. It compares the findings with the previous research and discusses the implications of the study.

4. The fourth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study and provides recommendations for future research. The references list the sources of information used in the study.

5. The fifth part of the report is an appendix containing additional information related to the study. This may include raw data, detailed calculations, or other supporting materials.

6. The sixth part of the report is a bibliography of the literature cited in the study. This provides a comprehensive list of the sources used in the research.

7. The seventh part of the report is a list of figures and tables. These provide visual representations of the data and results of the study.

8. The eighth part of the report is a glossary of terms used in the study. This helps to clarify the meaning of the words and phrases used throughout the report.

9. The ninth part of the report is a list of abbreviations and acronyms used in the study. This helps to simplify the text and make it easier to read.